

## ABSTRACT OF THE DISCLOSURE

The invention provides a method of detecting a chemical species with an oscillating cantilevered probe. A cantilevered beam is driven into oscillation with a drive mechanism coupled to the cantilevered beam. A free end of the oscillating cantilevered beam is tapped against a mechanical stop coupled to a base end of the cantilevered beam. An amplitude of the oscillating cantilevered beam is measured with a sense mechanism coupled to the cantilevered beam. A treated portion of the cantilevered beam is exposed to the chemical species, wherein the cantilevered beam bends when exposed to the chemical species. A second amplitude of the oscillating cantilevered beam is measured, and the chemical species is determined based on the measured amplitudes.